Fable

How AI Fails People With Disabilities: And How To Fix It

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Introduction

In this talk:

- The current reach of AI
- Some positives for people with disabilities
- The problems AI cause
- Solution 1: training and data
- Solution 2: inclusive testing
- Solution 3: inclusive implementation
- Conclusion: AI could be a force for good

The current reach of AI

The current reach of AI, part 1

Companies are spending over 50 billion dollars a year on AI.

- Examples of companies who use AI to screen résumés:
  - Hilton
  - Five Guys Burgers and Fries
  - AT&T
  - Procter and Gamble
  - Capital One

The current reach of AI, part 2

AI analyzes video to:

- Understand mood
- Transcribe dialogue
- Determine sentiment
- Enforce copyrighted material
- Collect data

The current reach of AI, part 3

Voice assistants:

- 97% of mobile users use voice assistants
- 40% interact with home assistants

The current reach of AI, part 4

In advertising:

- Premiered by Google
- Used by Facebook, Yahoo, Microsoft, Spotify, and others

The current reach of AI, part 5

Photo description and tagging:

- Looking for not-safe-for-work content
- Making images searchable
- Picking stock photos

The current reach of AI, part 6

Other applications:

- Medical result interpretation
- Travel planning
- Ordering search results
- Recommendations

The positives

The positives, part 1

Microsoft Seeing AI:

- Gives access to the visual world
- Identifies products, faces, and OCR text
- Describes scenes, and more

The positives, part 2

Accurate voice recognition:

- Built into most mobile devices
- Over 90% accuracy for speakers with midwestern American accents

The positives, part 3

Smart products:

- Provide access to those who cannot read screens
- Allow use by those with short- and long-term physical challenges

The positives, part 4

Recommendations:

- Can offer faster access to products and information
- Helpful for those who find searching for information challenging

The problems

The problems, part 1

No concept of disability or accessibility:

- Steam's AI models do not have accessibility as a datapoint
- Netflix recommendation system does not take captions or audio description availability into account
- Reddit recommends image posts to those unable to see them

The problems, part 2

Marketing and analytics systems don't account for disability:

- Was the ad uninteresting, or inaccessible?
- Those with unmet accessibility needs can be locked out of data collection entirely
- Assistive technology can make data collection inaccurate
- Some systems accidentally collect and act on sensitive data related to disability

The problems, part 3

Video-based systems fail people with disabilities:

- Eye movement is an inaccurate metric for many people
- Use of micro-expressions disadvantage those with physical challenges or who are not neurotypical
- Inability to accurately transcribe speech disadvantages those with physical challenges

The problems, part 4

Images described by AI cause bias:

- Describes men and women differently
- Misgenders many individuals
- Fails to correctly describe ethnicities
- Over-identification of objects present in training data

The problems, part 5

Voice recognition:

- Makes twice as many errors understanding marginalized accents or speech patterns
- Unable to understand stutters
- Locks people with disabilities out of telephone support and voice assistants

Solution 1:
Include people with disabilities in training and design

"If the data includes bias, the algorithm will copy that bias. You can't tell it to not be biased, because it doesn't understand what bias is."

Janelle Shane

Include people with disabilities in training and design

Good examples of inclusion in training data:

- Project Euphonia
- The ORBIT (Object Recognition for Blind Image Training) Dataset

Include people with disabilities in training and design, part 2

Accessibility needs must be included in models:

- Does media have transcriptions and audio description?
- What accessibility features does a game include?
- Does an image have alt-text?
- Is an app in app store accessible?

Include people with disabilities in training and design, part 3

Take people with disabilities into account during data collection:

- Are surveys and data collection methods accessible?
- Do analyzation methods account for minorities, and not average them away?
- Has care been taken to avoid giving the AI unnecessary data that could be used to train bias?

Solution 2:
Inclusive testing

Inclusive testing

- Exam proctoring and interview companies have no data about how AI systems perform for people with disabilities
- Only third-party organizations track the performance of AI voice recognition and transcription for minority groups

Inclusive testing, part 2

- A/B testing must ensure both A and B are accessible
- Testing must include people with disabilities in the process
- AI intended for one purpose should not be reused for another that is entirely different

Solution 3:
Inclusive implementation

Inclusive implementation

Ensure people with disabilities understand AI's limitations:

- Example: Google's model cards explain the limitations of AI to implementors and end users

Inclusive implementation, part 2

Provide fallbacks for AI systems:

- Example: allowing manual transcription when AI fails
- Text-based inputs for home assistants
- Ability to provide manual alt-text for images
- Frequent human review of AI based proctoring and interviews

Conclusion:
AI can be a force for good

AI can be a force for good

- Co-design in every stage is critical
- The wins for everyone are enormous, when AI is done correctly
- The journey is just starting
  - The best time to build an accessible foundation is now!